(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 479 404 A2**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **91302496.4**

(51) Int. Cl.5: **C11D 17/04**

(22) Date of filing: **21.03.91**

(30) Priority: **03.10.90 GB 9021516**

(43) Date of publication of application:
08.04.92 Bulletin 92/15

(84) Designated Contracting States:
CH DE ES FR GB IT LI NL SE

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(54) Packaging film and sachet product.

(57) A composite packaging film, capable of dispersing in lightly agitated water substantially without visible residues, comprises a continuous water-soluble base film, for example, polyvinyl alcohol, carrying on one or both surfaces a discontinuous, at least partially non-particulate layer of a second plastics material less water-soluble than the base film material, for example, nitrocellulose. The discontinuous layer may be applied by gravure printing.

The composite film is advantageously used for packaging detergents or other washing, cleaning or laundry treatment products in water-soluble sachets having reduced tackiness when handled with wet hands.

EP 0 479 404 A2

TECHNICAL FIELD

The present invention relates to a composite packaging film dispersible in water without leaving visible residues. The invention also relates to a laundry treatment product in the form of a water-dispersible sachet containing a laundry treatment composition, for example, a detergent composition.

BACKGROUND AND PRIOR ART

The use of water-soluble film material, for example, polyvinyl alcohol, for bags and sachets containing detergent compositions and other laundry treatment products is widely disclosed in the art, for example, in JP 61 057 700A (Kao).

A problem encountered with known water-soluble films, for example, polyvinyl alcohol films, is their tendency to feel tacky when handled with wet hands. This "wet tack" is a particular disadvantage in the context of laundry treatment sachets, the users of which may often have wet hands. In extreme cases the sachets may rapidly adhere to the hands of the user and partial rupture may occur.

Tackiness can also cause problems when sachets are stored in contact with one another under conditions of high humidity; the sachets may adhere to one another and attempts to separate them may lead to rupture.

EP 253 566A (Procter & Gamble) discloses a detergent sachet of water-soluble film, for example, polyethylene oxide, having an outer covering of flexible, apertured, water-insoluble but water-permeable sheet material, for example, a nonwoven fabric. This is said to give freedom from tackiness under high humidity storage conditions. For the consumer, however, it presents the disadvantage that the undissolved outer covering must be retrieved from among the washload after use.

JP 01 029 438A (Kao) discloses a water-soluble polyvinyl alcohol film, suitable for use as a detergent sachet wall material, coated on one or both sides with a fine water-insoluble powder applied by sprinkling an aqueous dispersion onto the base film. This treatment is said to render the film less vulnerable to atmospheric humidity.

EP 79 248B (Unilever) discloses a water-soluble polyvinyl alcohol film detergent sachet in which the sachet wall is provided with an inner protective layer of inert hydrophobic particulate plastics material, for example, polytetrafluoroethylene, to prevent attack by water or reactive components in the sachet contents.

These measures have the disadvantage that water-insoluble particulate material is introduced into the sachet product, and may remain as visible residues on washed fabrics.

The present inventors have now discovered a way of reducing the tackiness of water-soluble film such as polyvinyl alcohol to an acceptable level without adverse effect on the dissolution properties of the sachet material as a whole, and without resulting in unsightly residues being left among washed fabrics.

DEFINITION OF THE INVENTION

In its first aspect, the present invention provides a composite packaging film comprising a continuous base film soluble in water at a desired temperature, carrying on one or both surfaces a discontinuous, at least partially non-particulate layer of a second plastics material less water-soluble than the base film material, the composite film being capable of dispersing in lightly agitated water at the said desired temperature substantially without visible residues.

In its second aspect, the invention provides a composite film as defined in the previous paragraph, wherein the discontinuous, at least partially non-particulate layer is in the form of a printed pattern composed of a plurality of individual elements each sufficiently small to be substantially invisible to the naked eye.

In its third aspect, the invention provides a process for the production of a composite film as defined in the previous paragraph, wherein the second plastics material is applied from solution onto the base film, preferably by a printing method, to form a discontinuous, at least partially non-particulate, layer.

In its fourth aspect, the invention provides a package for releasing a composition or article(s) into an aqueous environment, the package being composed at least partially of a composite film material as defined above, carrying the said discontinuous layer at least on its outer surface.

In its fifth aspect, the invention provides a washing, cleaning or laundry treatment product in the form of a sachet or bag composed at least partially of a composite film as defined above, the discontinuous layer being present at least on the outer surface of the sachet or bag.

In its sixth aspect, the invention provides a laundry treatment product in the form of a closed sachet composed at least partially of a composite film as defined above, the discontinuous layer being present at

least on the outer surface of the sachet, and the sachet containing a laundry treatment composition.

DETAILED DESCRIPTION OF THE INVENTION

The invention is concerned with a composite film material for packaging articles or compositions that are to be released in an aqueous environment, and for the use of that film material for packages, in particular, washing, cleaning or laundry treatment products.

The composite film material

The composite film material has two essential components: the base film, and the discontinuous layer.

The base film is of material that dissolves readily in an aqueous environment at a temperature at which release of the contents of the package is desired. For laundry use, films that are soluble in water at a relatively low temperature, referred to generally as cold-water-soluble films, are preferred.

Water-soluble packaging films are widely disclosed in the literature and include polyethylene oxide, alginates, cellulose ethers such as carboxymethyl cellulose and methylcellulose, starches and starch derivatives, gelatin, and combinations of these.

In one preferred embodiment of the invention, the base film consists at least partially of polyvinyl alcohol. The term polyvinyl alcohol as used herein also includes partially hydrolysed polyvinyl acetates. These materials are widely disclosed in the literature.

The base film is conveniently heat-sealable so that it can easily be formed into bags, sachets or other packages. If the heat-sealability of the base film is inadequate, it may be increased by the provision of a coating of thermoplastic material on the surface not carrying the discontinuous, at least partially non-particulate layer. Such a coating may be provided at least in the areas where seals are to be formed, or as a continuous or discontinuous layer over the whole film.

If discontinuous, the thermoplastic layer may be of similar form to the discontinuous layer of the second plastics material, preferred forms of which are described in more detail below. In the interests of overall water-dispersibility of the composite film, a discontinuous layer of the thermoplastic material is generally preferred.

Obviously, the rate of dissolution and solubility of the base film must be at least as good as the ultimate requirement given above for the composite film: substantially complete dispersion (or dissolution), in lightly agitated water at an appropriate temperature, leaving substantially no visible residues. A detailed description of a method suitable for determining dispersion properties is given in the Examples below. The temperature at which substantially complete dispersion of the composite film is required will of course depend on the intended end use of the film.

The discontinuous, at least partially non-particulate layer is of a second plastics material having a lower water solubility at the relevant temperature than the base film material. Preferably the material is substantially insoluble in water at the relevant temperature. The choice of material will in part be governed by the method by which it is applied to the base film.

According to a preferred embodiment of the invention, the discontinuous layer is effective to prevent wet tack. For the purposes of the present specification, wet tack of a film is defined simply as a tendency for that film to feel tacky when handled with wet hands. Severe wet tack can lead lead to rapid rupture of the sachet, but even lesser degrees of wet tack are unpleasant for the consumer, and create a lack of confidence in the product. Wet tack has been assessed by means of a test described in the Examples below.

Also within the scope of the invention, however, is film having a discontinuous layer that, while not effective wholly to prevent wet tack, provides some protection against atmospheric moisture, and inter-sachet adhesion during storage.

If a single layer is insufficient to provide the desired level of protection against tackiness, two or more layers may be applied.

According to an especially preferred embodiment of the invention, as indicated above, the discontinuous layer is in the form of a printed pattern or matrix of individual elements each sufficiently small that after dispersion it will not form a visible residue. These elements may be of any suitable shape, but for convenience the printing term "dots" will be used.

The "dots" are preferably sufficiently close together to prevent wet tack. Without being limited by theory, it is believed that the "dots" should be of sufficient size and proximity that a wet hand touching the printed film will encounter only the "dots", and not the untreated areas in between; and that the "dot" spacing should be such as to prevent liquid bridges from forming between the hand and film while the

sachet is being handled with wet hands.

On the other hand, separation between "dots" must be such that the film will break up, under the appropriate aqueous conditions, into sufficiently small units. It will not generally be necessary for the "dots" to be completely separated from one another; areas of coalescence may be tolerated, provided that the material of the discontinuous layer is sufficiently brittle for such coalesced areas to be broken up, under the appropriate aqueous conditions, as part of the general break-up of the composite film material.

It is probable that the acceptable limits on the area, height and separation of the "dots" will also depend to some extent on the water-solubility of the material applied by printing: the less the water-solubility, the more important it is that, in the aqueous environment of intended use, the water has sufficient access to the base film to effect dissolution.

It has been found that use of a printing method to produce a pattern of "dots" allows completely water-insoluble materials to be used for the discontinuous layer without impairing the dispersion properties of the film. One preferred material that has been successfully tested is nitrocellulose.

The discontinuous layer may, if desired, be wholly non-particulate, and that is preferred because the chance of residues being produced in the wash is minimised.

It is also within the scope of the invention, however, for compatible particulate filler material of very small particle size (smaller than the "dots"), for example, silica, to be present in order to assist in the disintegration of the layer.

Preferably the discontinuous layer is present on one side only of the base film, but a base film carrying a discontinuous layer on each surface is also within the scope of the invention.

Production of the composite film

As already indicated, the composite film is preferably produced by applying the second plastics material from solution onto the base film to form a discontinuous pattern. This is most preferably effected by a printing method.

Suitable printing processes include screen printing, and, in particular, the various gravure processes such as direct reverse-roll gravure, or offset or indirect gravure. Any of the normal gravure patterns, for example, trihelical, quadrangular or pyramid, appear to be suitable provided that the criteria outlined above for "dot" height and spacing can be met.

Advantageously, the second plastics material is applied to the base film from solution in a non-aqueous solvent, for example, acetone, tetrahydrofuran or toluene, so as to avoid contact of water with the water-sensitive base film and to allow quick drying, thus avoiding excessive "dot" merging. The area, height and separation of the "dots" may be controlled via the viscosity of the printing solution.

Any fine-particulate filler material present should be substantially insoluble in the printing solvent.

As previously indicated, two or more layers may be applied if necessary.

Any thermoplastic coating for improving heat-sealability may conveniently be applied by a method similar to that used for the discontinuous layer of the second plastics material: preferably by a printing method, especially gravure printing. If, as is preferred, the thermoplastic layer is discontinuous, it is advantageously applied as "dots" in the same manner as the second plastics material.

The package

The invention also provides a package composed partially or wholly of the composite film of the invention. The film is useful for any packaging application that requires release, either rapid or slow, of contents into an aqueous environment. The discontinuous layer is located on the outer side of the film, or on both sides.

Apart from the uses in the washing, cleaning and laundry treatment field discussed in more detail below, the composite film of the invention is also useful for any other packaging applications, not connected with washing or cleaning, where release of contents into an aqueous environment is required.

The washing, cleaning or laundry treatment product

The composite film of the invention is especially useful for washing, cleaning and laundry treatment products.

One preferred embodiment of the this aspect of the invention, discussed in more detail below, is a laundry treatment product. Many other uses for the composite film in the washing and cleaning field can, however, be envisaged: for example, a rapid release detergent sachet for use in an automatic dishwasher,

or a slow release sachet for bath essence or the like. Clearly the speed of dispersion, and the temperature at which this is judged, will vary considerably depending on the release characteristics desired: a dishwasher sachet suitable for use in current dishwashing machines should generally be designed to release its contents quickly at 50-60 °C, while the a more gradual release pattern at a lower temperature is appropriate to a bath essence sachet.

Another possible use for the composite film of the invention in the washing and cleaning field is for bags for handling infected laundry in hospitals. The contaminated articles can be sealed into the bag which is then conveyed to the laundry and loaded bodily into the washing machine, thus avoiding the risk of infection to personnel.

The laundry treatment product

As indicated above, a preferred embodiment of the invention is a product for treating laundry in a domestic or industrial washing machine. The preferred product takes the form of a closed sachet composed at least partially of the composite film of the invention, the sachet containing a laundry treatment composition.

Preferably the composite film has a discontinuous layer on one side only: the outside of the sachet.

The preferred sachet of the invention, while remaining non-tacky when handled with wet hands, is capable of rupturing relatively rapidly in the wash water at ambient or higher temperature (depending on the wash conditions) to release its contents, and then dispersing within the time of the wash cycle to leave substantially no visible residues.

Sachets according to the invention have also exhibited improved storage stability, with a reduced tendency to adhere to one another when stored in close proximity under damp conditions.

Preferably the sachet is capable, in lightly agitated water at 40 °C, of rupturing within 10 minutes, preferably within 5 minutes and more preferably within 2 minutes; and of dispersing substantially completely leaving no visible residues within 30 minutes, preferably within 10 minutes, and more preferably within 5 minutes.

For low temperature wash usage, the sachet is preferably capable, in lightly agitated water at 25 °C, of of rupturing within 10 minutes, preferably within 5 minutes and more preferably within 2 minutes; and of dispersing substantially completely leaving no visible residues within 30 minutes, preferably within 10 minutes, and more preferably within 5 minutes.

For very low temperature wash usage, the sachet is preferably capable, in lightly agitated water at 8 °C, of of rupturing within 10 minutes, preferably within 5 minutes and more preferably within 2 minutes; and of dispersing substantially completely leaving no visible residues within 30 minutes, preferably within 10 minutes, and more preferably within 5 minutes.

The sachet may be of any suitable shape and construction. The most convenient shapes from the viewpoints of both manufacture and packing are square and rectangular, but any other desired shape is also within the scope of the invention.

The sachet may consist of a single compartment, or of a plurality of compartments. In a two-compartment sachet in accordance with the invention, the compartments may, for example, be side-by-side, joined by a common seal, or back-to-back, joined by a common wall. The former arrangement is more suitable if the two compartments are to be very different in size, and is also easier to make. Other multicompartment arrangements are disclosed in EP 236 136A (Unilever).

If desired, the sachets may be joined together in multiples, with perforations provided so that the consumer can detach the individual sachets. For example, if one sachet contains half the recommended amount of laundry treatment composition for a normal wash-load, the sachets may be joined in pairs. Each pair may then be used as such for a normal wash-load, but the consumer also has the possibility of using a single sachet only for a half-load, or of using three for an exceptionally heavily soiled load.

The size of the sachet will of course depend on the amount of laundry treatment composition it is intended to contain, and that in turn will depend on the type of composition, on the wash conditions under which it is intended to be used, and whether the sachet is intended to be a single dose or a half-dose (or other submultiple). The volume fill of the sachet may be anything up to 100%, and is preferably at least 50%, more preferably at least 60%.

The sachet contents

The contents of the sachet may comprise any composition intended for treating fabrics in a washing machine.

Suitable treatment compositions include fully formulated detergent compositions, components of detergent compositions, bleaches and fabric conditioners. The treatment composition is preferably in particulate, for example, granular or powder form, but may also be a liquid or a gel compatible with the sachet wall (composite film) material.

A preferred embodiment of the invention is a sachet as previously defined containing a particulate detergent composition for washing fabrics. Sacheted particulate detergent compositions according to the invention have been found to exhibit improved storage stability as compared with similar compositions sacheted in conventional water-soluble film material; reduced ingress of atmospheric moisture results in better stability of moisture-sensitive ingredients, for example, bleaches, and retention of good powder properties.

The detergent composition will contain, as essential ingredients, one or more detergent-active compounds which may be chosen from soap and non-soap anionic, cationic, nonionic, amphoteric and zwitterionic detergent-active compounds, and mixtures thereof. Many suitable detergent-active compounds are available and are fully described in the literature, for example, in "Surface-Active Agents and Detergents", Volumes I and II, by Schwartz, Perry and Berch.

The preferred detergent-active compounds that can be used are soaps and synthetic non-soap anionic and nonionic compounds.

Anionic surfactants are well known to those skilled in the art. Examples include alkylbenzene sulphonates, particularly sodium linear alkylbenzene sulphonates having an alkyl chain length of C_8-C_{15}; primary and secondary alkyl sulphates, particularly sodium C_{12}-C_{15} primary alcohol sulphates; alkyl ether sulphates; olefin sulphonates; alkane sulphonates; alkyl xylene sulphonates; dialkyl sulphosuccinates; and fatty acid ester sulphonates.

Nonionic surfactants that may be used include the primary and secondary alcohol ethoxylates, especially the C_{12}-C_{15} primary and secondary alcohols ethoxylated with an average of from 3 to 20 moles of ethylene oxide per mole of alcohol; and alkylpolyglycosides.

The total amount of surfactant present will generally range from 5 to 60 wt%, preferably from 5 to 40 wt%. Detergent compositions suitable for use in most automatic fabric washing machines generally contain anionic surfactant, or nonionic surfactant, or combinations of the two in any ratio, optionally together with soap.

The detergent composition will also contain one or more detergency builders, suitably in a total amount of from 15 to 80 wt%.

Inorganic builders that may be present include sodium carbonate, if desired in combination with a crystallisation seed for calcium carbonate, as disclosed in GB 1 437 950 (Unilever); crystalline and amorphous aluminosilicates, for example, zeolites as disclosed in GB 1 473 201 (Henkel), amorphous aluminosilicates as disclosed in GB 1 473 202 (Henkel) and mixed crystalline/amorphous aluminosilicates as disclosed in GB 1 470 250 (Henkel). Inorganic phosphate builders, for example, sodium orthophosphate, pyrophosphate and tripolyphosphate, may also be present, although these materials are no longer preferred for environmental reasons.

Organic builders that may be present include polycarboxylate polymers such as polyacrylates, acrylic/maleic copolymers, and acrylic phosphinates; monomeric polycarboxylates such as citrates, gluconates, oxydisuccinates, tartrate monosuccinates and disuccinates, glycerol mono-, di- and trisuccinates, carboxymethyloxysuccinates, carboxymethyloxymalonates, dipicolinates, hydroxyethyliminodiacetates, nitrilotriacetates, ethylenediaminetetraacetates, alkyl-and alkenyl malonates and succinates, and sulphonated fatty acid salts. This list is not intended to be exhaustive.

Detergent compositions according to the invention may also suitably contain a bleach system. This may comprise a peroxy bleach compound, for example, an inorganic persalt or organic peroxyacid, which may be employed in conjunction with an activator to improve bleaching action at low wash temperatures.

Other materials that may be present in the detergent composition include sodium silicate, fluorescers, antiredeposition agents, inorganic salts such as sodium sulphate, enzymes, lather control agents, pigments, and perfumes. This list is not intended to be exhaustive.

Preferably the bulk density of the detergent composition is at least 400 g/l, more preferably at least 500 g/l, and most preferably at least 700 g/litre, for example, 750-1000 g/litre. Obviously, the higher the bulk density, the smaller the sachet can be, and the lower the packaging costs and space requirements for storage. A sachet is also an especially convenient way of introducing a high-bulk-density detergent powder into the wash liquor, because it avoids any dispensing or dispersion problems that might be associated with a more compact powder.

EXAMPLES

The invention will now be illustrated by the following non-limiting Examples.

Test method for solubility and rate of dissolution and dispersion

A sachet of standard size (5 cm x 10 cm x 10 cm), filled with a standard dose (30 g ± 2 g) of detergent powder, was placed in 35 litres of water (6° French hard) at 8°C or 25°C in a National (Trade Mark) W102 top-loading washing machine for 5 minutes at the low agitation setting. A filter paper was then placed over the outlet and the machine drained. Dispersion was deemed to be substantially complete if no residues could be detected visually on the filter paper.

In the results below, this is indicated by "o"; "+" indicates very slight residues, while substantial residues (or complete lack of dissolution) are indicated by "x".

Test method for wet tack

Wet tack was assessed by a panel of experienced judges. The panellists were asked to wet their hands in water (6° French hard); they were then given the sachet under test to hold and feel for about 15 seconds, and to compare it with a standard polyethylene sachet. The test sachet was then allocated a value on the following scale:

1 = less tacky than polyethylene
2 = about the same as polyethylene
3 = more tacky than polyethylene, but not rupturing within 15 seconds
4 = extremely tacky, rupture occurring within 15 seconds

Sachet materials were tested in groups of four, with the panellists washing their hands between tests.

Examples 1 and 2

Four sachets having the dimensions given above, and filled with a standard dose of detergent powder as described above, were prepared by heat-sealing from commercially available cold-water-soluble polyvinyl alcohol film having a thickness of 30 µm (TECHNOSOL (Trade Mark) CTF 101 manufactured by Courtaulds Technical Films, Bridgewater, Somerset, England).

Example A, comparative, was a sachet of base film alone.

Examples 1 and 2, in accordance with the invention, were sachets of base film gravure-printed in two different patterns with nitrocellulose dissolved in acetone.

Example B, comparative, was a sachet of base film having a continuous coating of nitrocellulose.

Dissolution and wet tack results were as shown in Table 1.

TABLE 1

Dissolution and wet tack results					
	Coating material	Coating type	Dissolution		Wet tack
			25°C	8°C	
A	none	-	o	o	4
1	nitrocellulose	gravure 200 lines/inch	o	+	1
2	nitrocellulose	gravure 150 lines/inch	o	+	1
B	nitrocellulose	continuous	x	x	1

The storage stabilities of the sachets and their contents under severe conditions (20°C, 98% relative humidity) were also compared. The percentage increases in weight of the sachets, indicating the amount of moisture taken up, were as shown in Table 2:

TABLE 2

Moisture uptake on storage				
	Coating	% weight increase after storage		
		1 day	11 days	25 days
A	none	3.6	22.6	33.5
1	nitrocellulose gravure 200 lines/inch	2.0	15.0	28.0
2	nitrocellulose gravure 150 lines/inch	1.7	13.7	25.0
B	nitrocellulose (continuous)	1.5	10.3	21.4

It will be seen that the film having the 200 lines/inch gravure pattern was very nearly as effective as the film having the continuous coating at reducing the ingress of moisture; and the film having the 150 lines/inch gravure pattern also offered a significant improvement over the uncoated film.

Claims

1. A composite packaging film comprising a continuous base film soluble in water at a desired temperature, carrying on one or both surfaces a layer of a second plastics material, characterised in that the second plastics material is less water-soluble than the base film material and is present in the form of a discontinuous, at least partially non-particulate layer, the composite film being capable of dispersing in lightly agitated water at the said desired temperature substantially without visible residues.

2. A composite film as claimed in claim 1, characterised in that the discontinuous layer is effective to prevent wet tack.

3. A composite film as claimed in claim 1 or claim 2, characterised in that the discontinuous layer is of wholly non-particulate material.

4. A composite film as claimed in any preceding claim, characterised in that the discontinuous layer is in the form of a printed pattern composed of a plurality of individual elements each sufficiently small to be substantially invisible to the naked eye.

5. A composite film as claimed in claim 4, characterised in that the discontinuous layer is in the form of a gravure-printed pattern.

6. A composite film as claimed in any preceding claim, characterised in that the discontinuous layer comprises nitrocellulose.

7. A composite film as claimed in any preceding claim, characterised in that the base film comprises polyvinyl alcohol.

8. A composite film as claimed in any preceding claim, characterised in that the base film also carries, on the surface not carrying the discontinuous layer of the second plastics material, a layer of thermoplastic material to increase heat-sealability.

9. A composite film as claimed in claim 8, characterised in that the layer of thermoplastic material is discontinuous.

10. A process for the production of a composite film as claimed in any one of claims 1 to 9, characterised in that the second film material is applied to the base film from solution to form the discontinuous, at least partially non-particulate layer.

11. A process as claimed in claim 10, characterised in that the second plastics material is applied to the base film by gravure printing.

12. A package for releasing a composition or article(s), other than a detergent or cleaning composition or

an article to be washed or cleaned, into an aqueous environment, the package being composed at least partially of a composite packaging film comprising a continuous base film soluble in water at a desired temperature carrying on one or both surfaces a layer of a second plastics material, characterised in that the second plastics material is less water-soluble than the base film material and is present in the form of a discontinuous, at least partially non-particulate layer at least on the outer surface of the base film, and in that the composite film is capable of dispersing in lightly agitated water at the said desired temperature substantially without visible residues.

13. A washing, cleaning or laundry treatment product in the form of a sachet or bag containing a washing, cleaning or laundry treatment composition, the sachet or bag being composed at least partially of a composite packaging film comprising a continuous base film soluble in water at a desired temperature carrying on one or both surfaces a layer of a second plastics material, characterised in that the second plastics material is less water-soluble than the base film material and is present in the form of a discontinuous, at least partially non-particulate layer at least on the outer surface of the base film, and in that the composite film is capable of dispersing in lightly agitated water at the said desired temperature substantially without visible residues.

14. A product as claimed in claim 13, characterised in that the composite film is capable, in lightly agitated water at 40° C, of rupturing within 10 minutes and of dispersing within 30 minutes substantially without visible residues.

15. A product as claimed in claim 13, characterised in that the composite film is capable, in lightly agitated water at 25° C, of rupturing within 5 minutes and of dispersing within 10 minutes substantially without visible residues.

16. A product as claimed in claim 13, characterised in that the composite film is capable, in lightly agitated water at 8° C, of rupturing within 2 minutes and of dispersing within 5 minutes substantially without visible residues.

17. A product as claimed in any one of claims 13 to 16, characterised in that the laundry treatment composition is a granular detergent composition having a bulk density of at least 500 g/litre.

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 479 404 A3**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **91302496.4**

(51) Int. Cl.5: **C11D 17/04**

(22) Date of filing: **21.03.91**

(30) Priority: **03.10.90 GB 9021516**

(43) Date of publication of application:
08.04.92 Bulletin 92/15

(84) Designated Contracting States:
CH DE ES FR GB IT LI NL SE

(88) Date of deferred publication of the search report:
29.04.92 Bulletin 92/18

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EP 0 479 404 A3

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 30 2496

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
E	WO-A-9 117 202 (COURTAULDS PACK. LTD.)	1-9,12, 13	C11D17/04
A	* page 2, line 20 - page 3, line 12 * * page 5, line 24 - page 6, line 2; claims; example 1 *	10	
A	EP-A-0 246 897 (UNILEVER) * page 4, line 1 - line 12; claims *	1-14	
D,A	EP-A-0 079 248 (UNILEVER) * claims 1-3,11,12 *	1-9,13	
A	CA-A-681 635 (J. FRIEDMANN) * page 7, line 25 - page 8, line 8; claim 14 *	1-9,13	
A	DE-A-3 017 246 (P. MELCHIOR) * page 3, line 5 - line 15; claim 1 *	1,7,12	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

C11D
B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	02 MARCH 1992	GRITTERN A.G.

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